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The Automobile

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FRED. WALSH IN HIS GASMOBILE.
Courtesy of the Brooklyn Eagle.

JUST BEFORE THE START.

THE HAYNES-APPERSON SURREY AT THE FINISH.

THE LONG ISLAND AUTOMOBILE CLUB'S ENDURANCE TEST.

The Long Island One-Hundred-Mile Endurance Test.

The endurance test organized by the Automobile Club of Long Island took place according to program on April 20th, in weather about as unpropitious as could have been selected. Notwithstanding the hostility of the elements, the run was eminently successful, ten out of the fifteen machines started completing the course, and blue ribbons being won by two of these, while one or two others barely missed the coveted honor.

The course selected is clearly shown in the accompanying map. It was selected after much consideration, and its measurements checked in repeated runs by the committee in charge. It follows good macadam for practically the entire distance, and no grade exceeds 10 per cent. By the inclusion of the long loop from Queens through West Hempstead, Lynbrook and Springfield, back to Queens, it is made just one hundred miles long. The slope selected for the hill climbing contest is in Roslyn, and is about 1,500 feet long, with a maximum grade of about 8 per cent. Instead of one cup, three were offered by Mr. C. J. Field for this event, and the vehicles were divided into three classes, being respectively of machines below 1,000 lbs., from 1,000 to 2,000 lbs., and above 2,000 ibs.

On the night before the contest all the participants, including the press representatives who were to act as timekeepers, were invited to the club quarters in Brooklyn to listen to a talk by Mr. H. B. Fullerton, chairman of the Good Roads Committee, on the course to be followed on the morrow. This was copiously illustrated with lantern slides, and, in addition, a printed description of the course was included in the official program, and each timekeeper was given a blue-print map of the course.

The committee in charge and most of the contestants went out to Jamaica that night to be ready for the start, and Pettit's hostelry, the rendezvous of many tourists in that neighborhood, was filled to overflowing. There were twenty-five entries, of which twenty-two were gasoline vehicles, the others being two steam and one electric; and of these fifteen, all gasoline machines, were ready for the start. The full list of entries and starters is given at the end of this article. Of the non-starters, Mr. Webb, who had entered his 1899 Winton, was fully occupied as clerk of the course, and Mr. Adams, president of the club, found water in his gasoline tank on Saturday morning. The Haynes-Apperson Company's entry was the surrey belonging to Mr. Henry S. Chapin, Mr. Edgar Apperson coming on from Kokomo to drive it. Among the other machines, the 10 h.p. De Dion skeleton racer, driven by C. G. Wridgway, attracted much attention, as it was reported to be capable of great speed and was avowedly entered in the hope of establishing a record for the course. In contrast to this spider-like affair was a Daimler delivery wagon, loaded to half its capacity; while a 5 h.p. motorette, driven by "Tommy" Green, attracted amused attention. "Tommy," who is employed as a driver by the De Dion-Bouton Motorette Co., is said to be sixteen years old, but he does not look his age by two years.

The machines were started shortly after nine o'clock, at one or two minute intervals. A cup had been offered by Mr. Field for the best showing as regarded fuel consumption, but as it was found impossible to start every machine with its tank full, or to measure the contents of the tanks, this part of the program had to be abandoned. Several vehicles not entered in the contest started out over the course to follow the contestants. Among these were J. C. McCoy (referee), Dr. Chamberlin and Messrs. Pitt, Patterson, Webb and Spurr. Mr. Albert C. Bostwick had offered to take two of the judges and Mr. Fullerton over the course in his Panhard, cutting corners so as to get ahead of the contestants in order to time their passage and take photographs, but Friday night the Panhard was not ready to run, and a specially built Winton was brought up to take its place. On Saturday the Winton would do no more than crawl, so the party contented themselves with going in Mr. T. K. Hastings' Locomobile to Hempstead and back. In addition to its five regular entries, the De Dion-Bouton Motorette Co. sent a Darracq voiturette over the course after its entries as a sort of ambulance wagon, and this machine covered the course with hardly a stop, except to assist other machines.

Friday night no one looked for a hard rain the next day, but after the machines had got well started the wind rose and the rain came down in torrents, to the extreme discomfort of those riding—as all but one or two did—in open machines. In addition, the De Dion machines suffered more or less because, being so low to the ground, the secondary wires became grounded or short-circuited by the water thrown up from the wheels, a casualty which could easily have been prevented by the use of a little grease or a wrapping of rubber tape, if the weather had been foreseen. Mr. C. J. Field missed a blue ribbon in a somewhat similar manner, some dirt from the wheels getting at the vaporizer for lack of a shield below that organ.

The first arrival at Jamaica was a Gasmobile driven by Chas. Meyer, at 2:57 p. m. This was far ahead of its schedule time, and it was afterwards learned that the machine had been entered for the purpose of beating Wridgway's time. It had made four stops aggregating twenty

THE COURSE OF THE ENDURANCE TEST.

minutes or more. With the Gasmobile driven by I. M. Uppercu, which came in nineteen minutes later, it was disqualified for excessive speed. Uppercu's machine had made only one stop, which was accidental and due to momentarily throwing out the clutch. Next to arrive was C. R. Greuter in a Holyoke phaeton,

WRIDGWAY AND HIS RACER.

H. B. BARUCH IN HIS DARRACQ.

with one penalized stop of one minute. Mr. Greuter's elapsed time was 6:42, bringing him barely within the fifteen-mile an hour limit. This machine had made the best time for its class (over 2,000 pounds) up Roslyn Hill, its time being 2 minutes 10 seconds. C. J. Field was next, with the best time of the day up Roslyn Hill, 1 minute 48 seconds, and a clean record up to his eighty-fifth mile, when he was delayed for nine minutes by the vaporizer trouble above mentioned. A third Gasmobile, owned by John D. Pratt and driven by Fred Walsh, now followed. Mr. Walsh had gone through without a stop, and had clocked his time by an odometer and an open-face watch carried on the boot. His mean speed was a shade under fifteen miles per hour. Dr. H. B. Baruch followed, driving a 6 h. p. Darracq. He had made five stops, aggregating nine minutes, first on account of ice in his vaporizer and then to clean mud off from the trembler. At 4:36 Mr. Chapin's surrey came in, having made no stop except to recover its owner's hat, which stop was not penalized. Its record was considered especially creditable, because it was not taken from the factory for the run, but was an amateur's machine. The Columbia "jaunting car" followed, driven by E. A. Law and with Mr. A. L. Riker as timekeeper. It had made eleven penalized stops, the first of two minutes to tighten the clutch, and all the others on account of dirt in the carbureter, put down as a minute each, though the actual time was probably less. This was the only machine having a rumble seat to carry a third passenger, the rumbles of the Gasmobiles having been removed. This car won the hill-climbing contest in the class from 1,000 to 2,000 pounds. Mr. McMurtry, with his Packard, had the misfortune to skid his machine within a couple of miles of the finish, going sidewise into the curb and bending the rear axle between the bearing and the wheel. Up to that time he had but three stops, aggregating six and one-half minutes, and his last mishap was due primarily to his having followed the Jericho Pike, in which there were car tracks, instead of turning up to Hillside avenue. By removing the brake shoe next to the wheel rim he was able to come in, and the error in his route, which shortened his course only about a mile, was not counted against him. The last arrival to cover the course was the Daimler delivery wagon, which had passed Jericho without a stop, and since then had lost only eighteen minutes, due to dirt in the carbureter because the gasoline had not been carefully strained.

Of those abandoning the course, Tommy Green gave up at Massapequa on account of carbureter troubles, and Kenneth Skinner relinquished at Jericho for the same reason. Mr. Skinner's first stop, at Glen Cove, was on account of the sticking of the inlet valve. The trouble was first thought to be in the mixture, and this was altered before the inlet valve was examined. The machine was started, but the mixture went wrong again at Locust Valley, and a stop of an hour and a half was necessary before the carbureter was restored to its proper adjustment. Mr. Skinner then returned by the Jericho Pike, and had nearly reached Jamaica when the secondary wires became short-circuited by the wet, and the machine had to be towed in. Wridgway, after a very fast run to Roslyn, broke down half way up the hill, and after a second stop a few miles further on the machine proceeded to Queens, where its secondary current was short-circuited in the same way as Skinner's. The driver of the remaining motorette, Louvegnez, distinguished himself by giving up altogether when the rain began to come down smartly. He was last seen about two o'clock, headed for Brooklyn, with his machine in perfect order.

Owing to the weather, very few photographs were taken of the vehicles en route, and that of the Haynes-Apperson was the only one of any sort taken at the finish.

In addition to the map and instructions, verbal and printed, regarding the course, every turn had been placarded with an "R" or "L" and a red or white banner, and at all doubtful points an arrow indicated the direction, so that it was practically impossible to make a mistake about the course. Fifteen control points, marked by blue banners and serial numbers, were established at intervals, their distances from the start being marked on the maps, and these gave the time-

CHAS. MEYER READY TO START.

keepers a close check on the speed of the vehicles along the route. The arrangements throughout were admirable, reflecting the greatest credit on the enthusiastic members of the committee in charge, and the opinion was universally expressed that the event ought to be made annual or semi-annual.

The officials in charge were as follows: Referee, J. C. McCoy; Judges of Gasoline Vehicles, Malcolm W. Ford, H. C. Moore, L. A. Hopkins; Judges of Hill Climbing Test, A. R. Pardington, E. La Manna, R. E. Jarrige, W. F. Wintringham; Clerk of the Course, Frank G. Webb; Timer, Waldron Hoppins.

Retirement of Electric Cab Service.

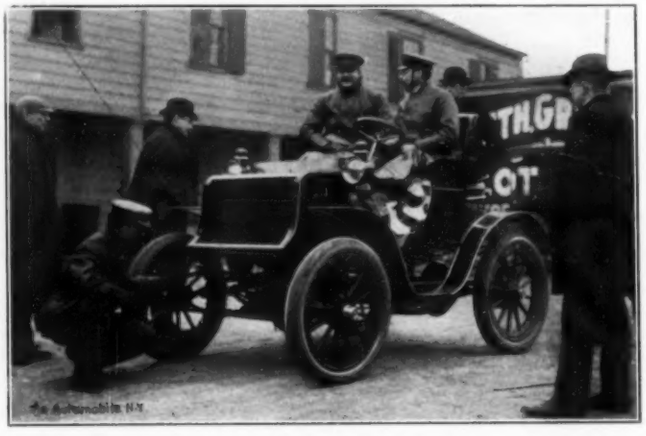
Because the expenses of operation were greater than the receipts, the New England Electric Vehicle Transportation Co. has withdrawn its cab and delivery service and gone out of business. Its books show a gross income, for the six months ending March 1, 1901, of $95,300, and total expenses of $211,969. This withdrawal involves the Newport station also, and Newporters will henceforth have to ride in their own carriages.

The Pennsylvania Electric Vehicle Co. has likewise discontinued its livery service for the same reason—that it was unprofitable—and will hereafter confine itself to renting vehicles by the month, at from $150 up.

A Wet Ride for a Ribbon.

By H. S. C.

"Nine-twenty-four," said the starter in a matter-of-fact tone, and with a bound of the heart we realized that we were off for a hundred miles, hoping, like each of the fifteen, that no stops would mar our record. Someone, we knew, would be disappointed. For seven long hours we should get no answer to that question, and the suspense had begun. Up we went over the first hill from Jamaica, and as we flew down the other side the timekeeper remarked, "Look out for your hats, boys," and raised his head—his own hat flying skyward on the instant. Four people were in our carriage, and the youngest of them sprang out to recover the lost headgear, while the carriage was slowed down and eventually brought to a stop. Had there been any question as to would have been kept in motion. In a this stop counting against us the carriage



A. L. RIKER AND E. A. LAW.

few moments up came the puffing boy and the run was resumed, the timekeeper marking forty-three seconds on the card, meanwhile wondering what items might fill up the blank spaces below. Fortunaetly only the rain got at the rest of the card. In a few minutes we were close to Flushing, with fifteen minutes still to spare and disqualification staring us in the face. From there on a heartbreaking loafing match ensued, our best efforts to hold down the speed being insufficient to prevent a still further reduction to a mere crawl before each point of control.

At Bayside the rain commenced to fall in perfect sheets, holding off a few moments and raising our hopes, but returning to the charge over and over until every occupant of the carriage was soaked to the skin. True, our mackintoshes kept the rain from the clothing, but enough water ran down around the neck of each passenger to soak the underclothing almost to a pulp. In this discomfort we rode mile after mile, passing various vehicles less fortunate than ours stranded in the drizzle, while the drivers worked like demons to spend as little time as possible on the repairs. It would be difficult to describe the sincere sympathy we felt for them, not knowing what our own fate would be. A sudden sharp turn to the right told us that we were at the top of Flower Hill and close to the hill-climbing contest. As we neared the bottom, running as slowly as possible, we ran alongside of Mr. Riker, the winner of last year's road race, and exchanged compliments, during which Mr. Riker warned us that he thought we were ahead of time, a sportsmanlike act that cannot be too highly commended.

We had been told to stop at the foot of the hill, and had reduced to three miles an hour before we understood from the gestures of the timers that a flying start was to be allowed. It was then too late to fly, and we started the hill at the slowest possible speed, which undoubtedly increased our time very greatly. The timekeeper's watch showed 3:26 at the top of the hill, but the officials' watches called for a longer period. We lost this contest

COMPETITORS AND AWARDS IN THE LONG ISLAND ENDURANCE TEST.

No.	Owner.	H. P.	Passengers.	Driver.	Start.	Finish.	Elapsed Time.	No. stops penalized.	Length of stops, minutes.	Percentage.	Ribbon.	Time up Roslyn Hill.
1	Knox Automobile Co.	4	2	Did not start.	.....	.....	.....	.....	.....	.....	.....	.....
2	Holyoke Automobile Co.	9	2	C. R. Greuter.	9:26	4:08	6:42	1	1:00	99	Red	2:10
3	Ohio Automobile Co.	9	2	A. L. McMurtry.	9:15½	5:14	7:58½	4	41:30	91	White	5:50
4	" " "	12	2	Did not start.	.....	.....	.....	.....	.....	.....	.....	.....
5	Long Island Motor Vehicle Co.	6	2	" "	.....	.....	.....	.....	.....	.....	.....	.....
6	De Dion-Bouton Motorette Co.	5	2	C. J. Field	9:12	4:10	6:58	1	9:00	98	Red	1:48
7	" " " "	5	2	Tommy Green	9:13	.....	.....	.....	.....	.....	.....	.....
8	" " " "	5	2	J. Louvegnez.	9:13½	.....	.....	.....	.....	.....	.....	.....
9	" " " "	5	2	Kenneth Skinner	9:15	.....	.....	.....	.....	.....	.....	.....
10	" " " "	10	2	C. G. Wridgway.	9:18½	.....	.....	.....	.....	.....	.....	.....
11	Hasbrouck Motor Co.	6	2	Did not start.	.....	.....	.....	.....	.....	.....	.....	.....
12	Haynes-Apperson Co. (H. S. Chapin)	8	4	Edgar Apperson	9:24	4:36	7:12	None	.....	100	Blue	3:30
13	Frank G. Webb (Winton)	6	2	Did not start.	.....	.....	.....	.....	.....	.....	.....	.....
14	H. B. Baruch (Darracq)	6	2	H. B. Baruch.	9:14½	4:20	7:05½	5	9:30	98	Red	3:30
15	Automobile Exch. and Stor. Co. (F. B. Stearns)	8	2	Did not start.	.....	.....	.....	.....	.....	.....	.....	.....
16	L. R. Adams (Winton)	9	2	" "	.....	.....	.....	.....	.....	.....	.....	.....
17	Automobile Co. of America	9	2	L. Markell.	9:17	.....	.....	.....	.....	.....	.....	.....
18	" " "	9	2	Chas. Meyer.	9:22	2:57	5:35	Disqualified.	.....	.....	.....	.....
19	Electric Vehicle Co.	5	3	E. A. Law.	9:20	4:50	7:37	11	11:30	97	Yellow	3:05
20	Daimler Mfg. Co. (delivery)	6	2	C. Harms.	9:17½	8:10	10:52½	4	18:00	96	Yellow	Not taken
21	Jas. McNaughton (Gasmobile)	9	2	I. M. Upperen.	9:23	3:16	5:53	Disqualified.	.....	.....	.....	.....
22	John D. Pratt (Gasmobile)	9	2	Fred Walsh	9:16	4:12	6:56	None	.....	.....	Blue	3:35

to Mr. Riker and were glad to see him win.

Again we were running freely in the driving rain, when a sudden "pop," resembling that of an explosion in the muffler, brought our hearts to our throats, An involuntary look over the side of the carriage sufficed to fill both eyes with mud from the front wheel, and then we discovered that it was only the right rear passenger blowing the sand out of his mouth. In five minutes the carriage sounded like a beer garden, all hands striving to keep the breathing apparatus free in this manner, but it was a hopeless task, the sand reaching even to our throats, causing violent coughing. Around our collars and clear to the waist that searching grit found its way. Again and again we passed others in trouble, and frequently they caught and passed us when the difficulties had been remedied, many a pleasant word serving to relieve the long strain. Our two extra passengers, enduring all this only that we might comply with a minor rule, were pretty glum for a while, but, catching the spirit of the occasion, kept us laughing with their comments on our appearance and the droll effect of the "pack of fools," as they called us, for sticking to such an undertaking; but under such conditions tne body must give way and spirits with it, and long, long silences ensued, broken only by puffing out the grit and rain. On the Wheatley Hills the gale was worse, driving right off the Sound straight in our faces till the simple rain drops felt like shot, and many a man daubed his face with dirt trying to discover if the skin had been punctured.

MOTORETTES BEFORE THE RUN.

At last Oyster Bay, and the turn before the wind was a relief second only to reaching the haven of rest. This enjoyment continued until, from Queens to West Hempstead, we again drove in the teeth of the gale, here much modified by the lower level, but much wetter, for the volume of rain was so great that landmarks could not be distinguished. Before we knew it we were right on top of the next control, with three minutes to spare and only 300 feet to run. We passed it a minute and three-quarters ahead of time, but purposely gained that and more before the next control point. Everything ran smoothly until we struck Hillside avenue, which, having been thickly resurfaced and thoroughly drenched, was a sea of mud several inches deep, in spite of which our spirits rose as we neared the finish with a record still clean.

Never had we expected to finish on our one tank of gasoline, and when a moment later one cylinder stopped acting our hearts sank as we felt sure that the exhausted tank would break our record, and that the other cylinder was only running on the small quantity remaining in the longer pipe which led to it. "Do you see that telegraph pole?" said the driver. "We will stop about there." But before we reached it both cylinders were again working merrily, and we then recalled the omission to oil one sparker before starting, a momentary dryness causing it to stick being the source of all the difficulty. It had started to work again, and we breathed easy. Nevertheless, this sign of trouble caused our hearts to beat with high tension during the remaining mile, until we rolled with a clean record across the finish line. Our photograph was taken,* and as we dropped off from the carriage we were scarcely able to stand, so great had been the nervous strain of those few anxious minutes. A little human gasoline dispelled all thought of our past discomfort. Imagine our surprise to find our gasoline tank still half full, and our oil and water less than a third gone, showing that a few moments' attention to light running bearings with an oil can would have put the machine in condition to do the whole thing over again. In fact, we ran the machine ten miles to the owner's home without any further attention, and now, almost a week later, it is still running on the supplies originally put into it for the hundred-mile endurance test. May there be many more such, for hard as it was, no one took cold and naught but the pleasantest memories remain.

*This photograph, which appears on the front cover, was taken with time exposure while the engine was still running, which accounts for its being seemingly out of focus.

A Good Roads Exposition on Wheels.

As has before been announced, State Senator H. S. Earle, of Detroit, Mich., is organizing a "Good Roads Train," which will carry roadmaking implements and machinery, and will visit a large number of states this summer. In each state visited a sample section of scientific highway will be constructed, the materials being furnished by the community interested and the labor, etc., being given free of charge by those engaged in the enterprise. In reply to THE AUTOMOBILE'S request for further particulars regarding his plans Senator Earle writes as follows:

"The object of this train is to exemplify to the people of this country what can be done toward building and improving roads by use of the scientific, modern machinery manufactured in this country. It is not wholly philanthropic, as the manufacturers who are to bear a large part of the expense of this train expect that from the advertising they will get orders enough so that the profit on the machines sold will pay them for their expense. Probably this will not be done in one year, but the eventual outcome of this trip will be to reimburse with a profit those who contributed and made it possible for this exhibition on wheels to go about the country. I am not sure how large a part of the country I shall cover at the present time, but I very much desire to get to both coasts, as in California there is a great demand for us—at Los Angeles, and also in the East, where I have an invitation from the Connecticut Valley Highway Association. I cannot date my trip nor tell the towns I shall go to until all applications are in. Probably I shall make the final decision about June 15th and start from either Detroit or Chicago, July 8th. It is my purpose to form what shall be known as the Good Roads Train Co. The company will be composed of a representative from each manufacturing concern which takes part in this exposition on wheels, and this company will elect its president, vice-president, treasurer, secretary, superintendent and transportation agent to carry out its purposes systematically.

"There have appeared in public print some articles that wish to draw Col. Moore, President of the National Good Roads Association, and myself into a controversy. Let me say that Col. Moore and I have the best kind of an understanding, and that it was neither he nor I that first thought of a Good Roads Train, for several years ago Mr. M. O. Eldridge, who is now Assistant Director of Public Road Inquiries, did the very same thing on a small scale, but he was ahead of the times and it was not the success that my good road train will be on account of the enthusiasm of the people at the present time for better highways. As soon as the dates and trip are settled upon, I shall be pleased to advise you."

The Haynes-Apperson Gasoline Carriage.

By Herbert L. Towle.

Barring Richard Dudgeon and two or three experimenters with motor bicycles, Messrs. Elmer and Edgar Apperson enjoy the distinction of being among the first, if not the first, automobile experimenters in the United States to produce a working machine. Like most other first attempts it was a crude affair enough, with an insufficient motor mounted on a heavy underframe, and its running gear showing a most imperfect appreciation of the nature of the stresses endured by a self-propelled vehicle. That was six or seven years ago, however, and the Haynes-Apperson vehicles of to-day are, in the writer's opinion, among the most interesting of their kind in this country. Their mechanism, while sometimes unconventional and not easy to explain on paper, shows nevertheless an admirable ingenuity in reducing to their simplest terms the operations of adjustment and manipulation required of the user, and this is done without to any extent compromising the mechanical efficiency of the whole. The materials for the following description were obtained from two surreys owned respectively by H. K. Browning, of New York, and Henry S. Chapin, of Rockville Centre, L. I., and were supplemented with some particulars kindly furnished by Mr. Edgar Apperson, of the company.

FIG. 1. THE HAYNES-APPERSON SURREY.

The motors used in all the Haynes-Apperson machines are of the opposed cylinder type, with explosions occurring alternately in the opposite cylinders and of liberal cylinder dimensions with quite moderate rotative speed. The 8 h. p. motor in Mr. Chapin's machine turns 450 r. p. m. when the vehicle is running twenty miles an hour. The top of the crank case is closed by a cover plate, and the entire mechanism is accessible from the tailboard, from the top of the rear end of the body, and from the top and front of the rear seat.

Instead of carrying the machinery in a long, stiff frame from front to rear, and bolting a light body on this frame, the machinery frame is made short, and the body, while still removable without disturbing the engine and transmission gear, is strongly framed and attaches directly to the foot springs. The axles are connected by two reach rods, which come together at the centre of the front axle, and are joined to the latter by a universal joint, thus relieving this connection of any wrenching due to unequal movement of the front axle. The wheels are 36 inches in diameter, with Sarven hubs and 3-inch tires. This, with the use of elliptic front and rear springs, brings the body fairly high, but the large wheels are a great advantage in negotiating rough roads, and as the gauge is standard—4 feet 8 inches—the stability is not impaired.

The most distinctive feature of the Haynes-Apperson machine is its transmission gear, and this is the most difficult part to describe. The photograph, Fig. 3, gives an idea of its appearance, and Fig. 4 shows some of its parts spread out along the lower of the two shafts in Fig. 3, so as to give an idea of their appearance. Its principle is as follows: The crank shaft of the engine is prolonged outward to the right, and carries four steel pinions of graduated sizes. Three of these give the three forward speeds, and the fourth or smallest meshes with an intermediate pinion to give the reverse. Directly beneath the engine shaft is a countershaft, on which are carried four gears meshing with the pinions just described. In Mr. Chapin's machine the left end of this lower shaft carries a sprocket pinion, from which a chain drives a spur pinion carried in a frame just above the differential on the rear axle, the pinion itself meshing with the gear on the outside of the differential. This arrangement, however, is not followed in Mr. Browning's machine, in which the differential carries a sprocket wheel in the usual fashion, and the countershaft has a steel spur pinion meshing with a slightly larger pinion just below it, the shaft of this latter pinion carrying a sprocket pinion on which the chain runs. The distance rod is between the rear axle and the lower pinion, which is carried in a frame swinging from the centre of the other pinion. By the use of these two spur pinions the engine shaft rotates in the same direction as with the former construction, and the up and down motion of the distance rod throws no strain on the main springs, as would be the case if the sprocket pinion were on the intermediate shaft itself, which would give the distance rod a quite steep slope downwards to the axle.

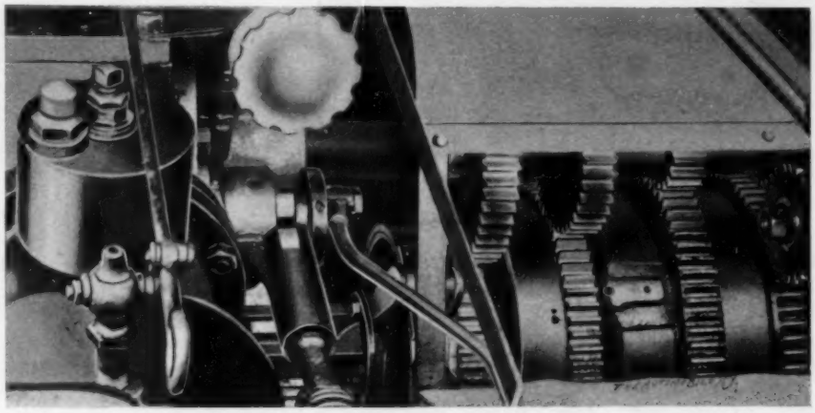


FIG. 3. THE SPEED-CHANGING GEARS.

Coming back to the speed-changing gears, the upper set is keyed on the engine shaft, while the lower four turn independently of the intermediate shaft, to

which they are connected by individual clutches. The principle of these clutches is best seen in Figs. 4 and 5. A steel casting, a or a′, is keyed to the shaft and has two arms, b c and b′ c′. To arm b is riveted a steel or bronze band d, which

FIG. 2. VIEW OF MACHINERY. MR. BROWNING'S SURREY.

is steadied by passing just inside of the end of arm c or c′, and to whose free end is riveted a forged strap e, whose end passes between the ears of arm b and is bent directly up at right angles. This end is then tapped for the set screw and lock nut f. A piece g (see also Fig. 6) has a bearing in the two ears of b, and

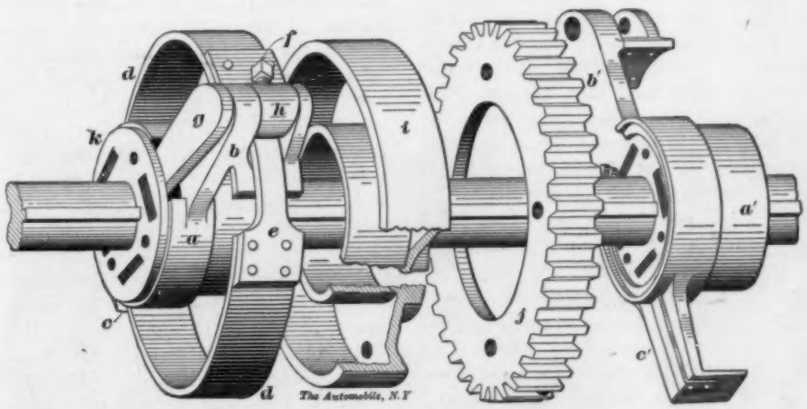


FIG. 4. DETAILS OF CLUTCH.

its lower end works in a slot cut in a. Between the ears it is squared to receive a piece h, whose lower end bears against the end of the set screw f. When the arm g is pushed forward to the position shown in Fig. 4, the effect is to tighten the band d by a small amount, by the action of the piece h against the set screw. As shown in Fig. 4, the casting a has a turned hub, and this hub gives a bearing to the casting i, on whose periphery the clutch band d acts. The gear j is bolted to the web of i, and turns or remains free, according as the band d is tight or loose. The left end of each hub a′ is recessed flush with the face of the arm b, to give room for the working of the arm g, and is recessed again to give a slight bearing for the right end of the next adjacent hub. The four hubs are simply strung end to end on the keyed shaft and bolted tightly together by four long through-bolts passing into the right hand one of the series. A circular plate k covers the left end of the first one and keeps the arm g from working out.

It only remains to operate the arms g by some suitable means. This is accomplished by the device shown in Fig. 7, which consists of four long fingers, each with a "knuckle" near its end, and the knuckles slightly staggered or set ahead of each other. They are seen also in Fig. 3, and the knuckle of the nearest one is half in and half out of the plate k. These four fingers run through slots in the plate k and in the several hubs a, which are made of liberal diameter to accommodate them, and are set each 90 degrees ahead of the other around the shaft. Thus each of the four arms g is operated by its own individual knuckle; and the knuckles are so spaced that only one clutch is tightened at once, and this clutch is wholly released before the next is tightened.

These fingers terminate at their left-hand ends in a grooved collar operated by a shifter in the usual manner, and suitable levers and rods connect this shifter with a long vertical lever at the driver's left. This lever works on a four-notched

FIG. 6. CLUTCH-TIGHTENING LEVER AND DOG.

sector, and gives the high speed in its extreme forward position and the reverse in its extreme backward position. Positions intermediate between notches release the clutches; or the lever may be pulled clear back to the starting point from extreme forward in one motion, as the clutches will slip before anything breaks. To adjust a clutch there is only the single

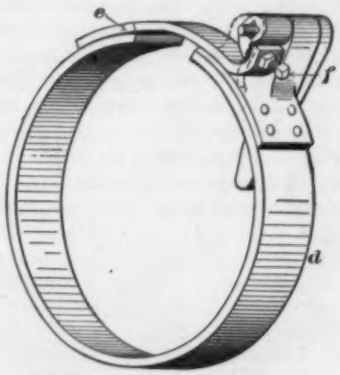


FIG. 5. THE CLUTCH BAND.

screw f to tighten, so there is no possibility of getting a lopsided adjustment, and owing to the large size of the clutches the wear is very small. The two oil holes in the end of arm c, seen also in Fig. 3, feed respectively the inner bearing surfaces and the gripping surfaces of the clutch.

Aside from the transmission gear, a special feature of the Haynes-Apperson is its vaporizer. One of these is provided for each cylinder, thus making the cylinders independent in case of a break-down. Both are fed via a float-feed gasoline cup from a 10-gallon tank under the front seat, and they are arranged in connection with throttle chambers, so that the closing of the throttle reduces also the gasoline aperture of the vaporizer in the right proportion. The two combined vaporizers and throttles are worked simultaneously by a button under the driver's heel, a spring under the button being arranged

to just balance the weight of the leg. The igniters are of the quick-acting make and break type, with primary spark, and, owing to the moderate engine speed, there is no provision for advancing the lead from the seat. A Holtzer-Cabot magneto is used, with a set of dry batteries for starting. As soon as the magneto picks up its current, an automatic switch, like a telegraph relay sounder, cuts out the batteries and throws the magneto into circuit. Fig. 3 shows the form of the cylinder oil cups, the grease cups on the crank shaft bearings, and the relief valves for starting. The two water tanks, as seen in the photographs, are arranged in the form of panels in the sides of the body, and are perforated with long tubes for greater cooling surface. Circulation is by gravity.

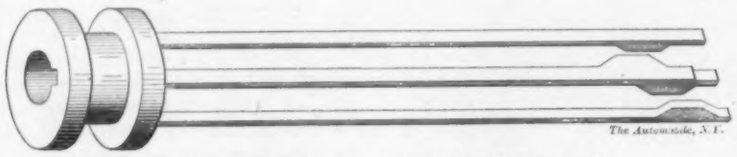


FIG. 7. THE SLIDING FINGERS AND KNUCKLES.

The Haynes-Apperson steering knuckles are by this time familiar; one of them is seen in Fig. 2. By their peculiar shape the steering pivots are brought as close as possible to the central plane of the wheel, and there is very little vibration transmitted to the steering arm. The writer has had no opportunity to test the running of the single-seated machines of this make, but the surrey certainly runs with remarkable smoothness, it being hardly possible to detect the impulses of the motor under ordinary conditions; and, while speeds above 23 or 25 miles an hour are not attempted, the power of the motor is certainly ample to handle the machine under any conditions.

A New Storage Battery by Edison.

Patents have recently been issued in England to Thomas A. Edison for a novel storage battery, for which the inventor claims a capacity, weight for weight, 100 per cent. greater than that of the lead storage cell, and of one-tenth the depreciation. From published abstracts of this patent we gather that it uses a solution of caustic soda, and perforated sheet nickel electrodes in which the active materials are respectively cuprous or red copper oxide and cadmium, both in a very finely divided state. The oxide acts as the depolarizer, and the caustic soda electrolyte remains ultimately unchanged, so that only a very small quantity of it is necessary. During the charging of the cell, cuprous oxide is formed and water is decomposed. During the discharge, cadmium oxide is formed and water is regenerated. The voltage is said to be .44 volt, and the internal resistance to be very small.

From Bridgeport, Conn., to New Haven via Derby.

By Paul Norwood, M. D.

There are two routes from Bridgeport to Derby. The one overland through Huntington Centre is the shorter, but the condition of the roads and the grades warrant one in taking the longer route, called the River road. The distance is fourteen miles. Leaving Bridgeport via Barnum avenue, the course is due east over macadam and clay roads till you come to Stratford Green, Stratford, Conn., a street running north and south. As you reach this street you turn to the left. The road bed is of sand and gravel, but is good in all kinds of weather. About a mile and a half north you come to the bank of the Housatonic River. Along the west bank the roads are mostly good, and you have but two up-grades of any moment. The first valley crossed is the one in which is situated Peck's mill, made famous by the trolley accident of August, 1899. Descending into the valley, the gradometer indicates 13.5 per cent. grade. Ascending the opposite bank the general course of the incline is 12 per cent.

There are several convenient places for replenishing the water tank, and if you do as I did, it will be no task to drop the end of a small steam hose (which is covered by a ball-strainer) into a water trough or creek, and then turn on your injector and fill either your boiler or tank, or both, just as you please, and this without getting out of your seat. Arriving at Shelton, which is geographically West Derby, you follow the trolley and cross a fine bridge over the Housatonic, and now you are in Derby.

The F. Hallock Co., Main street, will supply 74 test gasoline at 18 cents in five-gallon lots; 20 cents single gallons. At Lombardi's bicycle store any repairs on steam or gasoline motors can be made.

This trip is a beautiful one, the scenery rivaling any that I have passed over with my carriage.

From Derby pass east through Main street, and cross Naugatuck River, to East Derby, one-half mile, macadam. From the bridge turn right and follow main road. About half way to New Haven there is an ascending grade of 13.5 per cent., and about a mile further another short rise of 15 per cent. Two miles out of New Haven you descend a long 14 per cent. grade, which, when coming west, is troublesome, as it is never kept very well, and the travel is such as to keep it pretty well cut up. From the top of the hill the view is superb, giving one a view of New Haven, New Haven harbor, East Haven, Savin Rock, Morris Cove and East and West Rocks. After making the descent the roads are very good macadam. You pass one of the New Haven reservoirs and the Yale athletic grounds, and maintaining a straight course you arrive at Chapel street, which you will recognize by the perfect asphalt road. Turning down Chapel street, a mile and a half will bring you to Yale University, in the centre of the city. Altogether the roads are only fair. Distance eleven miles.

At New Haven gasoline may be had at the following points: Thompson & Belden, State street; Spencer & Matthews, State street, 31 Crown street, 154 Elm street, Orange and Center streets, 11 Church street; bicycle repair shop, 160 Orange street.

Fine runs may be made out of New Haven to various summer resorts. Easterly to Morris Cove, roads fine, no bad grades. Savin Rock, which lies southwest of New Haven, is on the shore, and reached by fine roads. Continuing on through Savin Rock there is a fine road right at the shore to Woodmont; no grades worth mentioning. West Haven (or Savin Rock) is about two and one-half miles from Yale University, Woodmont three miles further.

The White Steam Carriage.

The White Sewing Machine Co., Cleveland, Ohio, has produced the steam carriage shown in the accompanying illustration, in which the predominating feature is the use of a flash boiler, or a "generator" as they prefer to call it, instead of the ordinary shell boiler or the less frequent water tube boiler. It consists of helical coils of seamless tubing, one above the other, and surrounded by an insulating shell, with the burner at the bottom. The water enters the coils from the top, under the action of the pump, and passes completely into steam before it reaches the bottom coils, from which it issues in a superheated state. Hence there is no fixed water level, and none of the ordinary conditions of the steam boiler exist. The supply of fuel and water is regulated automatically, according to the power required, and as there is no body of water in the generator it cannot explode and is not damaged by becoming dry.

The burner contains a pilot light, which burns constantly and vaporizes the gasoline on its way to the main burner. To start the burner it is only necessary to heat the pilot light by burning a small quantity of gasoline in the drip cup. The pilot light is then started by opening its valve, and shortly after the main burner may be turned on. The engine has two double-acting cylinders with link re-

versing gear, and the cylinders are lubricated from a cup under the control of the operator.

Instead of the usual tubular reaches, these members are made of hickory, giving the necessary flexibility without joints. The differential gears are cased in.

Instead of locking the throttle, the handle which operates it is arranged so as to be removable at will, and it can be carried away in the operator's pocket when the carriage is left standing. The speed is controlled by the throttle.

FIG. 1. THE "WHITE" STEAM CARRIAGE.

The Rochester Steam Runabout.

The light steam carriage illustrated herewith is the product of the Rochester Cycle Mfg. Co., of Rochester, N. Y. It has a two-cylinder double-acting engine of 4 h. p., and a seamless shell boiler with copper tubes. Among its special features are a power air pump and a valve at the driver's seat by which the burner may be regulated. The throttle has a safety latch and the feed water is heated by passing through the muffler. A double-hinged mirror reflects the water glass. The brake is double acting, and 28 inch wheels with 2½-inch tires are fitted. The tanks hold six and thirty-five gallons of gasoline and water, respectively.

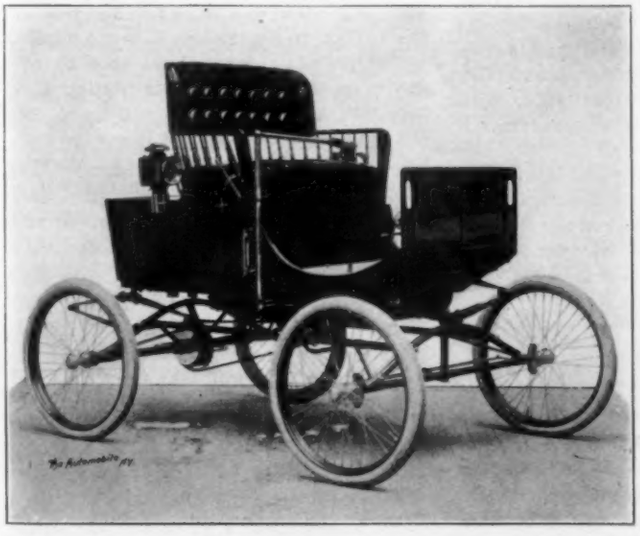


FIG. 2. THE ROCHESTER STEAM RUNABOUT.

The Reading Steam Delivery Wagon.

A delivery wagon of exceptional capacity is the new model built by the Steam Vehicle Co. of America, 253 Broadway, New York, and shown in the illustration. It is on the same lines as the Reading pleasure vehicles, but with much longer wheel base and a large carrying space, 51 inches long by 31 inches wide. As the cut shows, an auxiliary hand brake is fitted to act on the rear tires.

FIG. 3. THE READING DELIVERY WAGON.

The Pawtucket Steam Carriage.

The illustration herewith shows a new steam vehicle recently completed by the Pawtucket Steamboat Co., Pawtucket, R. I. It is distinguished by its substantial build and its large tank capacity, the latter being 14 and 35 gallons of gasoline and water respectively. The boiler is of the usual type, but with a water space around the fire. It has 70 sq. ft. of heating surface, and is rated at 7 h. p. An automatic regulator controls the by-pass valve, and the water is heated by the exhaust steam. An injector is provided as an auxiliary to the pump. The air pressure is maintained by a pump, a relief valve opening at forty pounds pressure. The engine has balanced cranks, and the rear sprocket, brake and differential are cased in. The underframe is jointed to give flexibility on rough roads. The total weight, with tanks full, is 1,700 lbs.

FIG. 4. THE PAWTUCKET STEAM CARRIAGE.

The Automobile

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What the Endurance Test Proved.

Aside from the bright examples of moral courage and physical resistance which shone so prominently in the recent endurance test of the Long Island Automobile Club, perhaps the thing most strikingly brought out on that occasion was the real insignificance of accidents necessitating stops on the way. Not only did two machines cover the course without a penalized stop and within the rules, while another, whose driver unfortunately preferred disqualification to a ribbon, made only an accidental stop of a few seconds, due to disconnecting the clutch while shifting a loose electric wire under his foot, but one other machine only failed of a blue ribbon through the easily preventable accident (had the weather been foreseen) of a little mud cast from the wheels on the vaporizer. The same unanticipated downpour stalled another machine through the wetting of its secondary wire connections, which likewise could have been prevented by a few minutes work in greasing or taping the binding posts; while still another machine abandoned the course merely because the cap of the water tank became lost, and with it most of the water, causing overheating of the engine and an hour's delay in cooling off and starting the pump. None of the other withdrawals was due to any mechanical derangement, and two of them were noteworthy as illustrations of the important truth that a vaporizer once adjusted is best let alone.

With all the wet weather there was only one accident due to skidding, but this, as usual in such cases, was somewhat expensive. Aside from this and the troubles with ignition and carbureter noted above and elsewhere, the weather appears in nowise to have affected the performance of the machines.

Taking it altogether, if the endurance test of the Long Island Automobile Club did not prove what automobiles can be depended on to do under any conditions, and such proof will have to wait until all drivers are experts, it at least proved abundantly what they are capable of doing in intelligent hands.

Electric Vehicle Competitions.

The electric carriage is not a touring vehicle, and it will never be entered in a tourists' run in competition with steam and gasoline machines. Realizing this fact, there was some discussion by the committee in charge of the L. I. A. C. endurance contest of the practicability of holding a fifty-mile contest for these machines over another course on the same day as the longer contest. Eventually no action was taken on this proposition, but a strong sentiment remained that the club ought to organize a separate contest for electrics at some time in the future, when these vehicles could compete under rules bringing out the good and bad qualities of their particular kind. The essential limitation of the electric vehicle is its restricted radius of action on a single charge, and the vital question to the purchaser is, How great is that radius? The obviously proper form of trial, therefore, is that which starts the vehicles together over a given route and requires that each shall continue traveling until its battery charge is exhausted. This kind of trial has been held a number of times abroad, and we cannot begin with it too early in this country. Obviously, the durability of the batteries enters largely into the question also, and it should be provided in the test that all batteries should be of standard type, in order to exclude specially-built batteries whose lightness would unfit them for service after a few runs. The weight of the vehicle should be counted in, also, and in particular it should carry only its catalogued battery equipment. If it were feasible, probably the most satisfactory test would include a measurement of the energy stored in the cells, and therefore of the charging cost at which the given mileage was obtained. Possibly this might be supplemented with another measurement of the charging current immediately after the run.

A test of this sort would give information of great value not only to intending purchasers, but to manufacturers as well. There is every reason to suppose that such an event, efficiently conducted by a disinterested club, would command abundant support and arouse great popular interest. The summer season is now fairly open. In view of the endurance test of the A. C. A. in September, it would hardly be worth while for a local club to organize an endurance test for tourists this fall, but the A. C. A. run will leave the electric field untouched. It is not too late for an active club to organize an electric vehicle contest in August. What club will do it?

The Rationale of "Skidding."

The annoying and oftentimes dangerous nuisance of skidding, which at first was thought to be an unavoidable evil, is now recognized as being largely influenced by the mechanical conditions of the case as well as by the character of the tires. So far as the latter are concerned, it is found that the greater the surface in contact, and consequently the less the pressure per square inch, the greater is the liability to slip. For a given vehicle, small tires are, therefore, safer in this respect than large, and solid rubber tires than pneumatics. Something can be done by ribbing or corrugating the treads, and were skidding always a matter of plain ordinary slipping, this would probably cover the case; but it is now recognized that the compensating gear plays an important part in the extraordinary gyrations which these vehicles sometimes execute, in the most unexpected manner,

on greasy asphalt. So long as the adhesion of the tires to the road exceeds the tractive force, both wheels will turn under normal conditions; but if one wheel slips while the other does not, the results are apt to be most peculiar. If the machine is starting from rest, the effect is merely to bring it to a stop. There is here no momentum to keep the machine going, and the consequences are usually trifling; but when the machine is traveling on a slippery surface at speed, and a brake is applied to a differential, the case is very different. To understand it, we may suppose that both wheels are brought suddenly to a stop, and that both are sliding together over the surface. Now, if one wheel meets a resistance which causes it to take hold of the surface, it will turn forward with the motion of the vehicle, while the other wheel revolves backward. The tractive force at the latter wheel will be only the slipping friction between it and the road surface, while the traction of the other, assuming that it does not slip, is equal to the friction of the slipping wheel plus the friction of the gears of the differential. This wheel, however, is not driving the vehicle forward as it would if the engine were running, but constitutes a point of resistance tending to hold the vehicle back. If now the front wheels are lightly loaded, they may readily slip sidewise, and then the whole machine by virtue of its momentum will spin around the non-slipping wheel as a pivot. Naturally it will not deviate very far from a straight line before the centrifugal force of its mass sends it off sidewise, and thus the "waltzing" is begun.

If on the other hand the brakes are not applied, but it is attempted to negotiate a curve, a sidewise slip may result, and one of the wheels may spin forward without adhesion to the road, thereby depriving the other of its ability to propel the vehicle and rendering the latter helpless. For this there appears to be no easy remedy, but for skidding when progressing in a straight line there are two cures. One is to provide rear wheel brakes on all vehicles, and to use only these where there is danger of skidding; and the other is to provide means for locking the differential so that it will turn as one mass.

Motive Powers Should be Classified.

It was freely declared by those who drew up the conditions governing the recent endurance test of the Long Island Automobile Club that the object of that test was to demonstrate publicly the relative value for touring purposes of the different motive systems as well as of different makes; and it was with this in view that stops to take on fuel or water supplies were penalized equally with stops for repairs. It is not strange, therefore, that only two steam vehicles and one electric were entered, or that two of these were entered "for the fun of the thing" and with no idea of winning ribbons. Nor, in view of the weather on the morning of the contest, is it to be wondered at that none of these machines was started.

But while no one need object to a competition on these lines, the question arises whether it is the most useful possible kind of a competition. Those informed on the subject understand that the steam carriage, even granting its shortcomings as a long distance machine, is by no means so utterly out of the running as the uninformed public would be apt to infer from the dearth of entries in a contest which punished all stops for supplies. In other words, a stop for water or gasoline is in the eyes of the owner of a steam carriage an extremely trivial matter as compared with a stop for repairs, and in fairness it ought to be differently classed.

To our way of thinking, the right kind of a competition would invite both steam and gasoline vehicles, but would put them in wholly distinct classes, penalizing stops for repairs alike in both cases, but simply recording and publishing the stops for supplies, or at most penalizing them one-quarter or one-half as much as stops for repairs. This would be equally effectual in acquainting the lay observer with the fact that steam vehicles are compelled to stop oftener than their gasoline rivals, and would at the same time avoid inviting criticism from those already informed on the merits of the case.

The Gentle Art of Making Copy.

It is to the popular press, and in particular to the exponents of that curious phenomenon known as "yellow journalism" that we most naturally look for misinformation on automobiles as on technical subjects generally. When we read in the Half-Hourly Fol-de-rol that Philostratus Muggs, the popular bartender of Prairie Dog, has invented a liquid air automobile which will revolutionize the industry in a month or two, we divine at once what is coming; and when in the next paragraph we learn that Philostratus' invention will do away with the motor by blowing the air against vanes on the wheel spokes, we know that the Fol-de-rol has done more at a stroke to brighten the gayety of nations than our humble efforts will ever attain to. When Willie Spilldriver, the young but gifted correspondent of the Evening Fly-Paper, writes that a syndicate of European and American capitalists has acquired the patents on a novel compensating gear, by virtue of which motor cabs can profitably be operated at a ten-cent fare, we admire Willie's talents, even though we should not want him for a contributor.

But while the saffron-tinted sheets are merely pursuing their natural bent as repositories of unconscious humor, the appearance of similar matter in a publication ostensibly devoted to the industry is enough out of the ordinary to excite remark. And yet one of our esteemed contemporaries, published not a thousand miles from New York, not long ago came out with one of the most delightful specimens of this sort that it has been our privilege to read. It is too long to quote, much as we should like to do so, but one or two of its choicest nuggets are too good to pass over. It purports to narrate certain adventures of King Leopold of Belgium, when driving his new racing Panhard. First of these is a slip in steering, through which the "powerful battery" rams the royal equipage through a peasant's cottage and out on the other side. For this demolition His Majesty makes liberal amends, and proceeds on his way faster than before. A blundering gendarme who tries to arrest him is rewarded with a secretaryship for his zeal, and then the King turns toward Brussels. The final incident, a brush between the King and a cyclist, deserves a paragraph to itself.

The royal scorcher is cutting along at "a gait of twelve atmospheres" (sic!) when the wheelman challenges him to a race. Leopold accepts. "He moved the lever a couple of notches. Clouds of dust and a wicked scintillation of sparks shot from the body of the ponderous motor. They were now bowling along at a twenty-eight horse-power rate. The Panhard sounded like a hundred million bee hives gone mad, and dashed across the road with infernal speed. The adjutant expected an explosion every minute. The wheelman hung on behind with bull-dog staying power, as if glued to the snorting monster before him. He could not be shaken off in spite of the fact that the royal racer was traveling perilously close to its speeding limit, and he was half blinded by the dust and the grime. He gained on the hills too much, and the King, seeing this, on arriving at the next hilltop, clapped on the remaining two horse-power, so that the big Panhard, with a sudden leap, shot down hill like a gleaming missle. At a full head of steam, with thirty horse-power tumultuously battling in its strong steel belly, crowding every ounce of dead weight and propelling power into the steep descent, it was no wonder that the 'go-devil' slipped away from the gamey wheelman. Fortunately, the road was superb and free from ruts and stones. At the breakneck plunge with which the royal carriage swept down hill it would only have required a very small obstacle to cause the machinery to jam or the boiler to explode"!!

A gasoline racing machine, with a big battery to push it along and shoot out sparks, and a steam boiler minus a safety valve to add to the interest—where in yellow journalism can we find the monster to match it?

From Boston to New York by Steam Carriage.

By Mrs. F. P. Avery.

Wishing to return to New York by a different route from the one by which we had journeyed to Boston, inquiry was made of automobile owners and a good road was mapped out as far as Providence.

An early start was made so as to enable us to take advantage of the Boston Park system, which is open to horseless carriages for a few hours early in the morning.

The road was perfect, the carriage flew along, the August morning air was delightful and Forest Hill was reached only too soon. From Forest Hill to Providence the road is quite good, and any small boy one meets can advise just what turn to take.

At Providence most discouraging information was given regarding roads to New London. My husband decided that as all roads were bad we would take the Providence and New London pike, as from the road map it seemed the best and shortest. Our intention was to spend the first night at Pine's Post Office, as that place also looked well on the map. A large sign advising all tourists in horseless carriages to "Keep Off" should be placed at the entrance of this pike. I felt doubtful at times if we were on the right road. The sand and hills seemed endless. In traveling nineteen miles the amount of naphtha was consumed which usually lasted from forty to forty-five miles. At every lonely looking house we saw we would ask for water, for not all wells had water in them and we were anxious to keep the reservoir full. The carriage would not even run down hill unless the throttle was wide open. Three times we stopped to pump water into the boiler, as it would not run in fast enough. About sundown we reached Pine's Post Office. There was no place for us to spend the night, and we were obliged to go on. Owing to the condition of the road we felt most anxious, as we knew it would be impossible to travel by lamplight. Steaming slowly along for three miles, we at last saw what we knew to be a light in a window. We rode up to the house and rang our bell; the farmer and his wife both came in answer. After an explanation on our part, we were invited most cordially to accept of their hospitality, which we did gladly.

The next morning by daylight we were up and off, after filling the tank with water.

The pike of sand ended at Hope Valley, where we arrived in time for breakfast. Having refreshed ourselves and filled both water and naphtha tanks our journey was resumed.

Our sorrows were not ended, as after long threatening the rain came down in torrents, and by the time Westerly was reached we were only too glad to seek shelter in the hotel until the storm was over. From Westerly to New London, where we spent the second night, the road was familiar, as we had traveled over that bit on our trip to Boston. At New London we took the boat to Sag Harbor. It was such a comfort not to be ordered to draw off the naphtha. In comparison with what we had been through, the roads in Long Island seemed to be as hard and smooth as the floor of a ball-room.

Long Island is the most enjoyable short tour I know of, as one is sure of fine roads and all the comforts of good hotels.

Although notice was given in time and every effort made to procure naphtha, the engine came to a dead stop miles from house or store, Two long, disagreeable hours were spent fighting mosquitoes while waiting for my husband to return from East Quogue, whither he had found a man driving a delivery wagon, to take him. At last my husband arrived with a large can of what proved to be half naphtha and half water. Some time was spent in letting the water run off and the engine started. It was quite dark before we arrived at East Quogue, where we remained for the night. It is a most restful spot, and the delicious canteloup served so bountifully there make me wish to return. However, by ten o'clock the next morning we were again steaming away, congratulating ourselves upon the perfect day and the good condition of the roads, when the most frightful report was heard. A vulcanized tire had a large hole torn in the place where the old puncture had been. About two inches of the rubber had given away. It was a most impossible-looking hole. My husband did some rapid tninking, at last said "I have an idea." My only idea was to take the train back to New York. Instead the carriage limped along a few yards to an L. A. W. road house, where that tire was filled with five pounds of common cornmeal, and the hole tied up with tire tape and some muslin wound around that. In this condition we traveled as far as Moriches, where we dined. Finding the tire had flattened somewhat, two and one-half pounds of fine hominy was added to the cornmeal, and off we started. As the tire was so heavy it was necessary to fasten it to the wheel in several places, which attracted much attention. One man asked if the tire really had that many punctures.

Reaching Islip about eight o'clock we remained there for the night. Although we arose with the sun, it was impossible to leave Islip before seven, as there was so much rebandaging to be done. The muslin with which the tire was fastened to the wheel wore out very quickly, and a number of times during the day, the bandages were renewed. Very good time was made, traveling too fast to be troubled with mosquitoes or heat, both of which were insufferable when we were obliged to stop the carriage.

The road from Islip to Brooklyn is good. We had no trouble crossing the Brooklyn Bridge, but by some mistake we found ourselves on Mott street in New York. I never expected to get out alive. By noon we reached the Locomobile shop in New York, where the carriage was left for repairs. The stuffed tire caused great amusement as well as surprise when it was learned that we had traveled seventy-five miles with the wheel in that condition.

A Well-Known Automobilist.

Mr. R. C. Mudge, whose portrait is shown herewith, is well known to our readers as an automobile enthusiast who has been identified with the industry almost from the first. Accompanied by his daughter, Miss Eva, whose portrait was published in the December issue of THE AUTOMOBILE, Mr. Mudge sailed for Europe April 23, for the purpose of investigating the status of the industry abroad. He will visit London, Paris, Italy, Russia and Switzerland, and will give special attention to the new applications of the several motive systems. Mr. Mudge will record his experiences and impressions in a series of letters for THE AUTOMOBILE, and will also tell about the routes most favored by tourists en automobile. As he is a close observer, an accurate description of automobile conditions abroad may be expected.

R. C. MUDGE.

It is probable that Alexander Winton's transcontinental tour in a motor carriage will be postponed until summer, as it is reported that the wagon route over the Sierra Nevada mountains will be impassable to vehicles earlier in the season.

CLUB NEWS AND VIEWS

Club Directory.

Automobile Club of America, Malcolm W. Ford, Secy., 203 Broadway, New York.

Automobile Club of Baltimore, W. W. Donaldson, Secy., 872 Park Ave., Baltimore.

Automobile Club of Bridgeport, F. W. Bolande, Secy., 49 Cannon St., Bridgeport, Conn.

Automobile Club of Brooklyn, C. Benton Dix, Secy., Hotel Clarendon, Brooklyn, N. Y.

Automobile Club of Columbus, C. M. Chittenden, Sec., Broad St., Columbus, O.

Automobile Club of New England, Geo. E. McQueston, Secy., Brookline, Mass.

Automobile Club of Rochester, Fredk. Sager, Secy., 66 East Ave., Rochester, N. Y.

Buffalo Automobile Club, Ellicott Evans, Secy., Lenox Hotel, Buffalo, N. Y.

Chicago Automobile Club, H. M. Brinckerhoff, Secy., Monadnock Block, Chicago.

Cleveland Automobile Club, L. H. Rogers, Secy., Cleveland, O.

Columbia College Automobile Club, Lewis Iselin, Secy., Col. College, New York.

Indiana Automobile Club, August Habich, Secy., Indianapolis.

Long Island Automobile Club, C. W. Spurr, Jr., Secy., 552 State St., Brooklyn.

Massachusetts Automobile Club, L. E. Knott, Secy., Ashburton Pl., Boston.

New Bedford Automobile Club, E. G. Watson, Secy., New Bedford, Mass.

New Jersey Automobile Club, Dr. H. Power, Secy., Upper Montclair, N. J.

North Jersey Automobile Club, E. T. Bell, Jr., Secy., Paterson, N. J.

Philadelphia Automobile Club, Frank C. Lewin, Secy., Hotel Flanders, Phila., Pa.

Pennsylvania Automobile Club, H. J. Johnson, Secy., 138 N. Broad St., Philadelphia.

Rhode Island Automobile Club, F. A. Fletcher, Secy., 42 So. Water St., Providence.

San Francisco Automobile Club, B. L. Ryder, Secy., San Francisco, Cal.

Worcester Automobile Club, H. E. Sheiland, Secy., Worcester, Mass.

A Good Roads Rally of the A. C. A.

At the annual dinner of the Automobile Club of America in the Waldorf-Astoria, April 18th, good roads furnished the keynote of the addresses of the evening. Mr. A. R. Shattuck presided, and there were many distinguished guests, among them Lieutenant-General Nelson A. Miles; General Roy Stone; Edward A. Bond, New York State Engineer; D. R. Budd, Commissioner of Roads for New Jersey; Dr. H. H. Kane, president of the Road Drivers' Association; Captain Edgar Jadwin, representing the Secretary of War; H. B. Fullerton, of the Long Island Automobile Club; Representative J. S. Sherman; Thomas M. Moore; Thomas A. Edison; Lewis Nixon and others.

Lieutenant-General Miles, in responding to the toast of the National Highway Commission, complimented the club on its aggressive stand in behalf of good roads. Road improvement, he said, kept pace with civilization, and the automobilists in taking the lead in its behalf became leaders in civilization. He said that though the Roman roads were built primarily for military purposes commercial advantages had followed in the train; and he pointed out that almost everything hauled as freight by the railways had to be carried in wagons to and from the railways, this terminal expense being very greatly increased by bad condition of the roads.

Mr. E. A. Bond, in response to the toast "Present Necessity for State Aid in Highway Improvements," caused much enthusiasm by announcing that the proposition was being considered at Albany to issue state bonds for $5,000,000 for road improvements. He pointed out that the appropriation for good roads in New York State amounted to only 3.3 cents per capita, as against 46 cents in New Jersey; 77 cents in Connecticut, and 80 cents in Massachusetts. Mr. Bond predicted that the time was not far distant when there would be a national highway from Maine to California.

Speeches were made also by General Roy Stone, Representative J. S. Sherman, M. J. Verdery, M. F. De Young, and Dr. H. H. Kane, while Mr. Shattuck, speaking for the club, told of the work accomplished in legislation and of the projected sign posts throughout the state and New England.

Joint Parade in Philadelphia.

The Automobile Club of Philadelphia and the Pennsylvania Automobile Club joined forces on April 13th in a parade, in which seventy-two vehicles took part, besides a number of motor cycles. The route led from Broad and Locust Sts. to Fairmount Park and return, and was witnessed by a large throng of spectators.

Death of F. W. Tousey.

It is with great regret that we have to record the untimely death of Mr. Frederick W. Tousey, the assistant secretary of the Automobile Club of America. He was taken ill with pneumonia on the day when the club moved into its new quarters at 753 Fifth Ave., and it was believed that he was on the way to recovery when the announcement came from Bridgeport of his death.

Mr. Tousey was formerly assistant secretary of the Automobile Club of Great Britain and Ireland, and the successful planning and completion of the thousand-mile endurance tour of that club last year was largely due to his instrumentality. It was largely because of his success in that connection that he was induced to come to New York in the interests of the A. C. A. On account of his death the arrangements for the tour from New York to Buffalo this fall, will have to be completed by other hands.

The Automobile Club of America.

Mr. H. B. Fullerton, chairman of the Good Roads Committee of the Long Island Automobile Club, talked on good roads at the meeting of the A. C. A., April 9th. He showed nearly a hundred lantern slides, giving views of roads all over the world, and showed pointedly the backwardness of New York State in this respect.

New Jersey Automobile Club.

The Automobile Club of New Jersey has invited the Automobile Club of America to participate in a run to Lake Hopatcong on May 11. During this month runs were held to Plainfield, Ridgewood, Pompton Plains and Perth Amboy, N. J. The spring parade will be held on Memorial Day. The future headquarters of the club will be at the Continental Hotel in Newark.

National Capital Automobile Club.

The first run of the National Capital Automobile Club took place Monday, April 8th, Lieutenant-General Miles leading. Despite the inclement weather eighteen miles were covered in an hour and a half, with sixteen carriages in line.

Chicago Automobile Club.

The Chicago Automobile Club held a successful run on April 13th, in which seventeen vehicles took part. The route was from the club quarters to Lincoln Park, to the West Park system and return.

The Doughty Bill Passed.

The Doughty bill, defining the rights of automobiles in New York State passed the Senate with an amendment giving the Park Department of New York City the right to determine the speed of automobiles within its domains, but not to prohibit their entrance. Another section amends the red-flag law so that it does not apply to automobiles. The Assembly concurred in these amendments, and the bill has been signed by Governor Odell. The full text of this bill, except for the Senate amendment, was published in THE AUTOMOBILE last month.

Correspondence.

Space will be given on this page to letters concerning the Automobile, its operation or construction, to accounts of tours or runs, routes of travel, good roads, etc. When requested by correspondents their names will not be published, but must always be given in the communication to the Editor.

The Body as a Carrier for the Machinery.

Editor THE AUTOMOBILE:

Mr. Krarup's able article on "running gear design" has been read with interest, but one statement therein seems to deserve correction. He says, page 78, "The course followed by the distinctively American builder has been less simple and more ambitious," and proceeds to describe the American practice of making the body of the vehicle serve also as the carrier of the machinery. The point objected to is that this method is less simple. It is not the custom of American builders to adopt complex forms needlessly, and our own experience with this arrangement is that it is the most simple form yet shown. We formerly mounted the motor and its parts on the running gear and kept the body separate therefrom and mounted on its own springs, but subsequent experience showed this method to be faulty for a number of reasons. More parts were necessary, causing increased cost and weight, while the light body vibrated more than a heavier body held steady by the inertia of the motor and parts. We have since adopted the practice of making the body slightly heavier and causing it to perform three functions—that of body, of framework for the machinery and of framework for the vehicle. These three functions are different in their requirements and the same strength that serves one is sufficient to serve another with little or no increase in weight. The same framework on which the body is built, by serving two other purposes saves two other frames; a great step toward simplicity and decreased cost.

As to further results we get the entire weight of the vehicle, excepting wheels and axles, mounted on springs, which adds to the long life and to the comfortable riding of the vehicle. The only objection to this method is that specially designed bodies are necessary, and this is not an objection from the user's point of view, for it insures him the best results. Any automobile that is constructed by picking up a horse vehicle body and clapping it on top of a traction engine will not be a satisfactory vehicle. It is well known that combination devices are not satisfactory and that the best machines are designed throughout for their particular purpose. The same rule applies to the motor vehicle and requires that the body as well as the other parts should be designed for their work and in their proper relation to the other parts of the same vehicle.

Our design of body is accessible from all sides and permits any part of the mechanism to be examined or repaired without getting under the carriage and without removing the body. It is, therefore, more satisfactory than the system having the motor in front. It is much less bulky, complicated and heavy. It is much more pleasant to ride in and handles much easier because of the less weight on the steering wheels. We believe this system only requires to be known by the public in order to be demanded.

Chas. E. Duryea.

Reading, Pa., April 24.

An Example for Other States.

Editor THE AUTOMOBILE:

It may be well for you to know that by proper manipulation in the Roads and Bridges Committee of our Senate, of which I am chairman, we were able to turn a very bad Traction Engine law into a very good automobile law. The old law for traction engines compelled any person owning and controlling a traction or other engine propelled by themselves, servant, agent or other employe, to send a man ahead at least ten rods to notify drivers or horses that the engine was coming, and a representative in our legislature had added to this law, that they should also be compelled to carry four planks 16 feet long, 12 inches wide and 2 inches thick. This would be a nice little load for a common automobile, which under the law would be a steam carriage or vehicle, and would be compelled to carry planks, but I was able to cut the planks out, and also cut from the old statute the man ahead, and now a traction engine or automobile run by steam or other motive power has only to stop in case a team is frightened, and assist the team to pass, and also to carry a red light at night. I have told the introducer of the bill, Mr. Randall, that he would find his name going all over the country as a public benefactor.

H. S. Earle.

Detroit, Mich., April 12.

An 8 H. P. De Dion Model.

The De Dion-Bouton Motorette Co. announces that it will soon put on the market a new size of De Dion water-cooled motor, rated at 8 horse-power. This motor has one cylinder, 100 by 110 mm., or practically 4 by 4 1-3 inches, and is equipped with a light extra flywheel coved to form part of a friction clutch. Including this clutch it weights 140 lbs., and without it 110 lbs. With this motor will be produced a new motorette, called the "Paris," which will be a considerable departure from the "New York" type now familiar. It will carry the motor under a bonnet in front, and will have three speeds by shifting gears, together with wheel steering, tonneau body, and wood wheels when ordered. It will weigh about 1,000 lbs. and will be ready about June 1.

The Cost of an Automobile.

Dr. Paul Norwood, of Ansonia, Conn., sends the following interesting table of his average and total expenses in connection with his steam carriage for eight months up to January 1, 1901. Dr. Norwood uses the carriage in his practice and for pleasure. Regarding the table, he writes that some of the charges made by the makers for renewals were clearly excessive, and brought the repair account materially higher than it should have been. For example, he mentions a charge of $4.95, plus 25 cents for expressage, for fifteen boiler tubes, whereas fifty similar tubes were sent express free by the manufacturers of those articles for $4.60. The table follows:

AUTO LOG FOR EIGHT MONTHS ENDING DEC. 31, 1900.

Top carriage for two persons.
Weight loaded, 1,153 lbs., without passengers.
Tires, 2½ × 28-inch Hartford.

Days owned	242
Days laid up	66
Days operated	176
Miles traveled	2,682.4
Average mileage per day while in order	14.4
" minutes of repair pr mile traveled	4.43
" cost, new parts per mile traveled, cts.	2.6
" cost for tires, pr mile traveled, cts.	1.63
" Amount lubricating oil, not including lead sticks, etc., drachms per mile	43
" cost per gallon of gasoline,* cts.	14.5
" cost for gasoline per mile, cts.	2.24
" number miles per gallon gasoline	6.38
" total cost per day's run	$2.32
" total cost per month (242 days)	$58.61
Improvements, not included in above	$60.00
Tools	$20.95

Months.	Time charged for repairs.	My own time spent in repairing.†
May	$23.05	0:00 hrs.
June	11.00	4:30 "
July	4.30	18:00 "
August	.30	4:30 "
September	.70	22:00 "
October	3.20	29:00 "
November	5.10	16:00 "
December	0.00	32:00 "

*74 and 76 test. †Not including ordinary care

Many expenses are not enumerated above, but total averages include everything spent on or in consequence of the automobile. No collision or accident of that kind happened.

A Monster Combination Machine.

The latest thing in a combination gasoline and electric vehicle is a racing car which is being built for Jenatzy, who will be remembered as the owner of the "Jamais Contente," and torpedo-shaped electric racing car which for two years has held the record for the flying kilometre. This latest car has a gasoline engine rated at 60 h. p. and an electric dynamo and motor rated at 40 h. p. The latter with its battery is intended as a reserve equipment to be charged during light running by the surplus power of the engine, but in an emergency the driver will have to whole 100 h. p. at his disposal for a short time.

Kilpatrick, the one-legged trick bicycle rider, will this season use a "Mobile" in making a dash from the top of the tent to the ground in Forepaugh's circus. Last season he made use of a bicycle in his perilous descent.

A Gasoline Bus from St. Louis.

The gasoline omnibus shown in the accompanying illustrations has lately been built by the St. Louis Motor Carriage Co. for regular service between Nashville and Lewisburg. It is built to seat fifteen passengers, but can be crowded to carry twenty, and its top is strongly constructed for the reception of baggage. The motor and transmission gear are carried in the front part of the frame, which is of angle steel, and the body is bolted on the same frame. As seen in Fig. 1 the motor, which has a single cylinder and is rated at 25 h. p., drives the first shaft of the transmission gear by a chain. The second shaft is supplied with a brake, and the differential is in the third shaft, which drives the rear wheels separately by sprocket chains. There are two forward speeds and one reverse by gearing, and by the throttle any speed up to twenty miles an hour may be obtained. Emergency band brakes are fitted to the rear wheels, and wheel steering is used.

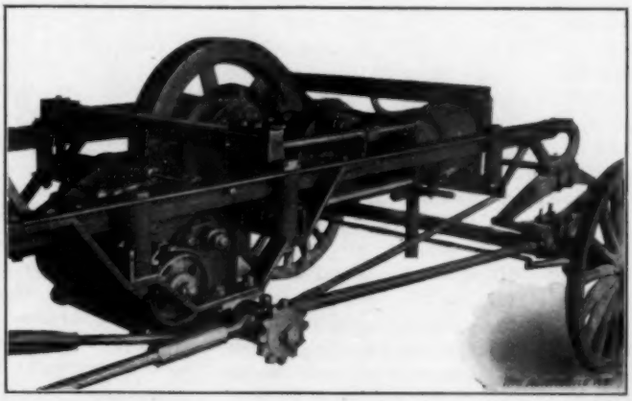


FIG. 1. ST. LOUIS GASOLINE BUS. FRONT END OF FRAME.

FIG. 2. A GASOLINE BUS FROM ST. LOUIS.

The total weight of the vehicle is 5,600 pounds.

The New York Motor Vehicle Co. intends to send its twenty-passenger steam omnibus, which was exhibited at the Madison Square Garden show last fall, to the Pan-American Exposition under its own power.

It is announced that an automobile club will shortly be organized in Indianapolis, Ind.

The New De Dion Vaporizer.

The De Dion vaporizer illustrated in these pages last month has been adopted by the De Dion-Bouton Motorette Co. for use on all its machines, in place of the older style used till now. The new vaporizer has only one adjustment, and in all normal running the direct passage, which allows a stream of air to pass straight across and dilute the carburetted mixture, is kept closed. By a further turn of the lever arm the mixture may be throttled, but this procedure is seldom resorted to, speed being usually controlled by the ignition lead and by another new device which varies the lift of the exhaust valve, so that on a light load part of the burnt gas may be entrapped and used to dilute the fresh charge.

The "Locomobile" Co., of America has removed its principal New York offices from 11 Broadway to the Transit Building, 7 E. 42d St.

Ralph Johnson, trick bicycle rider, has recently purchased a "Mobile," which he will use in touring during the summer.

Automobile Week at Nice.

Since 1897, a feature of the automobile season in France has been a week of sports at Nice, in which the pick of the racing machines in all classes have contested for supremacy. The records made in the speed events of these five years fairly indicate the progress made in that time, and a retrospect is therefore interesting.

The first "course de vitesse," or contest of racing machines, as opposed to tourists voiturettes and motocycles, was run in two stages from Marseilles to Nice, 134 miles, with stop at Frejus. Most of the entries were 6 h. p. machines, but the race was won by a steam break belonging to the Count Chasseloup-Laubat, at a mean speed of 18½ miles per hour.

The following year Charron, who last year won the Gordon-Bennett cup, was first with a mean speed of 23 miles over a similar course. In 1899 the course was from Nice to Castellane and back, over an irregular road, and the winner was Lemaitre, with a speed of 25 miles.

Last year the course was from Nice to Marseilles and back in two stages. On account of the weather and the condition of the roads the return trip was not attempted, and the palm of the first day's run fell to Rene de Knyff, whose 16 h. p. Panhard covered the 134 miles in 4 h. 25 m., or at a mean speed of 34 miles an hour.

This year the principal speed event was over a different course from Nice to Rix, Senas, Salon, and back to Nice, 287 miles long, and was run in one stage. It was won by Werner, Baron Henri de Rothschild's mecanician, driving a 35 h. p. Mercedes Daimler. Speed was lowered through villages, and the distance thus covered deducted from the total, making the net length of the course 243 miles, over which the mean speed was 36 miles per hour.

The week opened with a flower parade on Sunday, Mar. 24, in which prizes were awarded to M. Just Fernandez, the Princess d'Essling, the Baroness de Zuylen, and M. Garibaldi. The last-named drove a carriage entirely covered with white flowers and roses, while M. Fernandez's vehicle was ingenuiously transformed into a mimic trolley car, complete with numbers and sign boards, and a trolley arm overhead seeking an imaginary wire. On Monday took place the "course de vitesse," above referred to, and also a race for tourists over a shorter course, Nice-Draguignan-Nice, 120 miles long, or 83 miles deducting "controls" through villages. The former event was decided in three classes: A, motocycles and voiturettes up to 550 lbs.; B, two-passenger machines up to 880 lbs.; C, heavy machines for two passengers. Class A was won by Demester on a Gladiator tricycle with 6 h. p. Aster motor, at a mean speed of 34 miles. Class B was won by Henri Far-

man, driving a Darracq voiture with 12 h. p. Perfecta motor, mean speed 29 miles. Class C was won by Werner as above stated.

In the Tourists' race the winners were as follows: Class A (as above), Cormier, in a Marot-Gardon voiturette with 6 h. p. De Dion motor, time 3h. 24m.; Class B (as above), Thery, in 7 h. p. Decauville, time 3 h. 46 m.; Class C, vehicles from 880 to 1,320 lbs., four passengers, Koechlin, in 7 h. p. Peugeot, time 3 h. 11 m.; Class D. vehicle from 1,320 to 2,200 lbs., four passengers, Serpollet in 12 h. p. Serpollet steam car, time 2 h. 42 m.; Class E, vehicles over 2,200 lbs., six passengers, "Sir Knapp" (W. K. Thorn) in 35 h. p. Mercedes, 3 h. 40 m.

On Thursday a mile race with standing start was combined with a kilometre race with flying start. An electric circuit connected the start and finish of the mile course, and at the instant of the start the current started a chronometer at the finish. At 609 metres from the start another chronometer took the time of passing, which was telephoned to the finish, thus giving the starting time for the kilometre. The best times for the mile and kilometre respectively were as follows: Osmont (De Dion motocycle, 8 h. p), 1:22 3-5 and 42 2-5; Edmond (Darracq voiturette, 12 h. p), 1:32 1-5 and 48 4-5; Serpollet (4-pass. Serpollet steam car), 1:17 4-5 and 38; Werner (Mercedes, 35 h. p), 1:16 4-5 and 41 4-5.

The Henri de Rothschild cup race for the kilometre with flying start was next run off. It was won in 35 4-5 seconds by Serpollet, with Werner second in 41 4-5s. Serpollet's speed was slightly over 62 miles per hour. This was followed by another mile and kilometre race, for those not placed in the races of Monday. The best time was made by Beconnais, on a Perfecta-Soncin tricycle of 8 h. p., being 1:07 2-5 and 39 1-5s., respectively. The former was the best time made by any machine for the mile, as Serpollet's was for the kilometre.

On Friday the leading event was the Nice-La Turbie race, over a hilly course 9.9 miles long, with a maximum grade of about 10 per cent.

The Richmond Automobile Co., Richmond, Ind., is building a steam engine for automobiles which is claimed to be both the simplest and the lightest motor on the market. Some of its features are given as follows: Weight, 46 pounds; twin cylinders, 2½ by 3½ inches, double acting; valves balanced, no eccentrics, variable cut-off; power, 5 h. p. at 450 revolutions.

Lee's American Automobile Annual, 1901 edition, contains, like its predecessor, a large quantity of miscellaneous information on the several types of automobiles, including motive powers, steering gears, tires, etc., together with notes on legislation and the principal automobile events of 1900. It is published by Laird & Lee, Chicago.

The "Federal" Kerosene Runabout.

A steam carriage burning kerosene for fuel, and containing several novelties in arrangement and design, has lately been completed by the Federal Motor Vehicle Co., 81 Willoughby street, Brooklyn, N. Y. Its engine is a double-acting compound, with cylinders 2½ and 5 by 4 inches, and is designed with large plain bearings and especial reference to rigidity and long life. Piston valves are used, being operated by eccentrics on a valve shaft, which is geared by a train of four pinions to the crank shaft. Instead of the usual link motion, reversal is effected by means of these pinions, the intermediate pair of which are carried on swinging straps, which may be shifted in such a manner that, while the pinions are always in mesh, by shifting the positions of the intermediate pinions the valve shaft may be rotated the necessary amount to reverse the motion of the valves. The cut-off is fixed and one lever controls the engine.

Reversing the usual arrangement, the water tank is under the seat, and the boiler and engine are in the rear of the body, where they are readily accessible. The kerosene is vaporized in a coil over the burner, and burns with a blue flame. A special starting device dispenses with the need of a torch. Instead of the feed pump, an automatic arrangement is used consisting of a closed cup at the water level outside the boiler, having connections to the steam and water spaces of the boiler and to the water tank. When the water is low, a float working inside the cup cuts off the boiler connections and opens a valve in the supply pipe. The cup then fills with water, and the float cuts off the supply and opens the boiler connections, when the water flows by gravity into the boiler. The operation is then repeated.

An Automobile Day in Boston.

The Harvard Auto Corporation, which has recently opened a large store and repair station at Park Square, devoted itself to a special display of its facilities on April 19. Manufacturers, dealers and agents were invited to use the station for exhibition purposes without charge, and the public at large was freely welcomed. The waiting room was decorated with flowers and palms, and fully a thousand people are reported to have visited the station on that day.

The Rochester Automobile Co., Rochester, N. Y., is putting on the market a set of mud guards or fenders for steam carriages. Their model A is especially adapted to locomobiles and mobiles, but will fit any carriage with 28-inch wheels. The manufacturers will make any special shapes or sizes required for other vehicles.

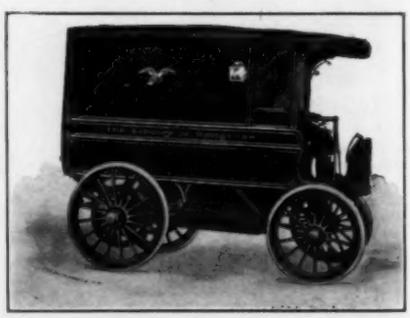
The Chicago Show.

Among the novelties at the Chicago show held under the auspices of the "Motor Age," was a two-wheeled electric vehicle, built by A. B. Holson of Chicago. This curious machine has two wire wheels over 6 feet in diameter, each driven by its own electric motor, and with the battery and seat hung between them and below the axle. Steering is accomplished by braking one or the other motor to allow the other to run ahead slightly, and it is said that there is no unpleasant swinging when in motion.

The track was devoted to giving free rides to visitors, and no racing was permitted. In its place, however, an affair of wheels and rollers was constructed, on which any vehicle could be mounted, and its wheels made to revolve without forward progress. Roller bearings were used in the apparatus, and the frictional resistance was naturally at a minimum. Some remarkably fast miles were made, an indicator on a dial being used for this purpose, but as there was no air resistance, and practically none of any other sort save that due to internal vibration in the vehicles and to the wire-drawing in the cylinders, it could hardly be said that the tests proved much.

A Wagon in Government Service.

The manager of the Washington Electric Vehicle Transportation Co. writes as follows regarding the Mark XI Columbia delivery wagon, recently purchased by the Government for the use of the Congressional Library: "Before the Library people purchased this vehicle they sent out circular letters asking for bids from all the different manufacturers. They also investigated the subject very closely,



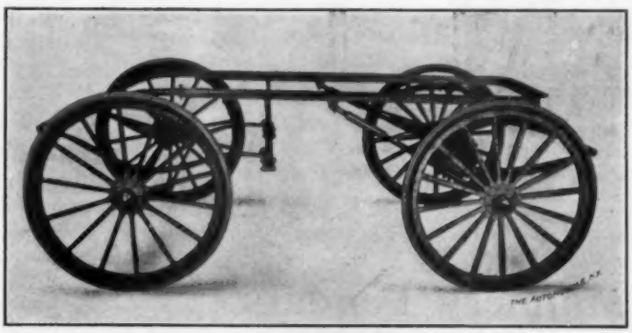
THE LIBRARY OF CONGRESS WAGON.

and, while our vehicle was the highest in price, still the contract was awarded to us. The fact that we had vehicles of this type and other types running successfully in Washington had great weight in the matter. The Library people have been operating this vehicle themselves for the last month, and are very much pleased with it."

This wagon has a load capacity of 1,000 pounds besides driver and attendant, and with the new long-distance batteries of the company it has a rated radius of 35 miles on one charge.

A Running Gear for the Trade.

A. L. Dyke, lately connected with the St. Louis Automobile & Supply Co., is now in business on his own account in the Linmar Bldg., Vandeventer St., St. Louis. He supplies the same line of running gears, engines, transmission gears and sundries which were supplied to the St. Louis Automobile & Supply Co. The accompanying illustration shows the flexible running gear made by him, with elliptic rear springs and radius rods, and semi-elliptic front springs linked at their rear ends to a transverse spring bolted at its centre to the forward transverse member of the frame.



THE DYKE FLEXIBLE RUNNING GEAR.

Business News.

The Searchmont Motor Co., 1230 Orkney St., Philadelphia, has doubled its capacity by putting on a night force.

H. F. Borbein & Co., St. Louis, Mo., have sold their business to the Brecht Automobile Co., St. Louis, to whom all communications should be addressed.

Oberlin & Co., McKeesport, Pa., are about to enter the automobile agency business and will have several vehicles on display in the near future.

A neat folder setting forth the advantages of the Locomobile and the Winton comes from the Rochester Automobile Co., Joseph J. Mandery, proprietor, Rochester, N. Y.

The Quaker City Automobile Co., which has purchased the business and location of Maurice Loeb, at 306 N. Broad St., will take the Philadelphia agency for Duryea gasoline vehicles.

The Scott Automobile Co., St. Louis, has acquired the business of the Scott & Cooper Co. and the St. Louis Automobile & Supply Co., and is prepared to turn out both electric and gasoline vehicles.

The "Big Four" Ry. is now running new trains from Chicago to Cincinnati that will rival any trains in the country in comfort and beauty. The new coaches carry 87 passengers, and the parlor cars have few equals on any of the roads.

The Reliance Gauge Column Co., Cleveland, O., are manufacturers of a small low-water alarm for steam vehicles. This is equipped with high and low-water gauge cocks, and carries an automatic whistle which sounds when the water becomes low.

The Motsinger Device Co., Pendleton, Ind., has booked a cable order for one hundred of its "Autosparkers" from Panhard & Levassor, Paris, France. This order was placed after exhaustive tests and in the face of the best European competition.

The Duryea Power Co. has issued a pamphlet in which are quoted many letters and other expressions of opinion published in the automobile press in favor of gasoline vehicles, and concluding with a number of testimonials from the users of Duryea vehicles.

The Glines Liquid Rubber Co., Providence, R. I., announces that it has discontinued the manufacture and sale of tire fluid. This action is taken as a result of a conflict of patents with the Buffalo Specialty Mfg. Co., which makes the "Never-leak" tire fluid.

The Eastman Automobile Co., Cleveland, O., has sold the motor vehicle branch of its business to the Benson Automobile Co., of Cleveland. The reason for this step is that the metallic body business of the Eastman Company has so grown as to engross all its energies.

The Geneva Automobile & Mfg. Co., Geneva, O., is fitting up a storage room at its factory, opposite the L. S. & M. S. R. R. passenger station, where tourists can store their machines over night without charge. Supplies will be furnished and repairs made at a minimum cost.

The Remington Automobile & Motor Co. will shortly remove its factory from Ilion to Utica, N. Y. It is hoped to have the new factory ready by the 10th of May, and until then the Ilion factory will be kept open. All of the company's workmen will follow it to the new location.

The American Steam Gauge & Valve Co., Boston, celebrated its fiftieth anniversay on April 16th. The general offices of the company were converted into a handsomely decorated dance hall, and a dinner was followed by dancing, the guests of the evening being the employes and officers of the company, with many of the stockholders.

The Crest Mfg. Co., Cambridgeport, Mass., is marketing a special lubricating oil for gasoline motors, which it calls Crestoline. It is claimed to be of high viscosity and able to endure a very high temperature. It is a blend of mineral oils alone, no animal or vegetable oils being added to it, as these cause fouling of the cylinder and sparking plugs. It is put up by the company in one-gallon cans.

The Conrad Motor Carriage Co., Buffalo, N. Y., has removed to its new factory at 1417 Niagara St., where it has largely increased space and facilities. The new site has railroad facilities and street-car service every few minutes. The company states that it has just received a large order from Glasgow, Scotland. It will exhibit in Space 5 in the Machinery and Transportation Building at the Pan-American Exposition.

The International Motor Carriage Co., whose factory is located at Stamford, Conn., has established sales offices and a show room at 114 Fifth Ave., New York City. Carriages will be kept on exhibition. The new feature of the International carriage this season is its side steering. It is claimed to be the only gasoline carriage starting with foot lever. Mr. A. S. Winslow, secretary of the company, will be located at the new office.

Patents.

670,121—Automobile running gear. Issued to W. Van Wagoner.
670,085—Motor vehicle driving and steering gear. Issued to H. A. Spiller.
670,405—Motor vehicle. Issued to R. M. Hunter.
670,776—Automobile running gear. Issued to L. T. Gibbs.
670,746—Motor road vehicle. Issued to J. Vollmer.
11,890—Means for propulsion of vehicles by electricity. Reissued to Newman & Ledwinka.
671,214—Automobile. Issued to S. C. Judd.
671,036—Automobile driving mechanism. Issued to W. Van Wagoner.
670,966—Vehicle explosive motor. Issued to J. Pender.
670,972—Self-propelled vehicle. Issued to M. M. Smith.
671,721—Automobile gearing. Issued to F. L. Dyer.
671,532—Automobile vehicle. Issued to Warren & Hoffman.
671,673—Variable speed reversing drive for automobiles. Issued to W. L. Judson.
671,575—Motor carriage. Issued to W. J. Woosley.
671,478—Vehicle driving mechanism. Issued to J. Grimme.
671,687—Brace for motors of self-propelled vehicles. Issued to J. H. Bullard.
672,030—Motor vehicle. Issued to D. T. Clark.
672,075—Vehicle steering gear. Issued to E. H. Cowart.
672,718—Automobile driving gear. Issued to P. Steinhauer.
672,713—Horseless carriage. Issued to E. Sanchis.
672,670—Motor vehicle steering device. Issued to S. E. Freeman.
672,620—Vehicle steering mechanism. Issued to J. P. Horton.
672,644—Vehicle steering mechanism controller. Issued to A. F. Madden.

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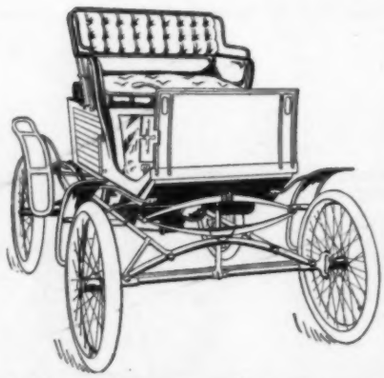

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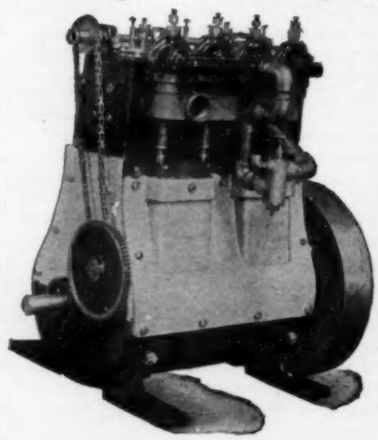

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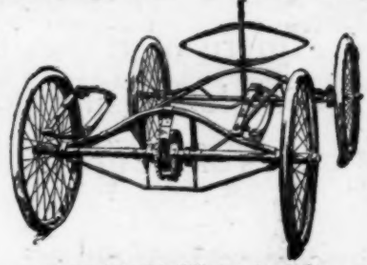

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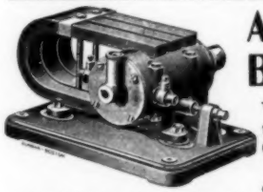

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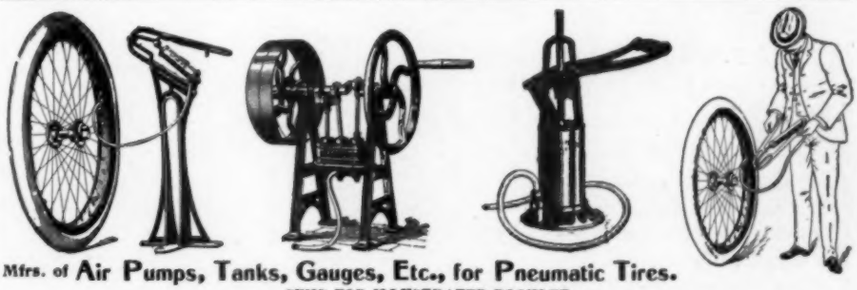

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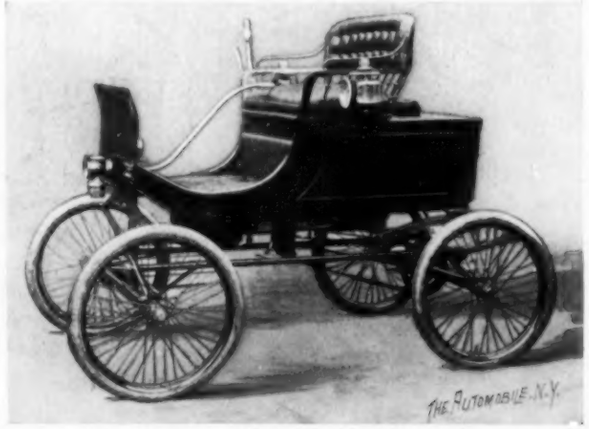

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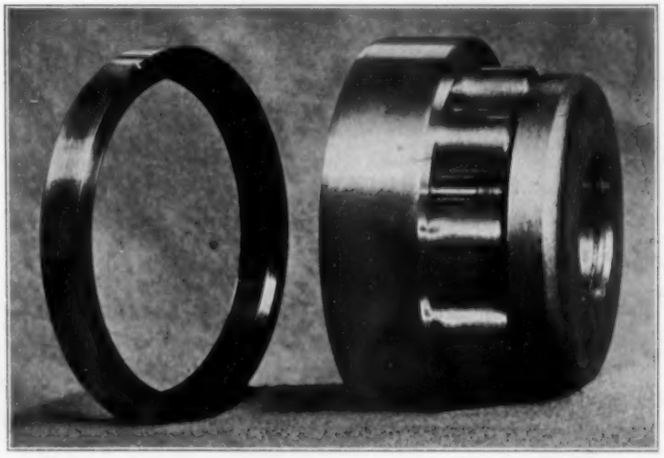

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